



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/530,389 | 04/04/2001 | Jens Berger | 2345/127 | 6185 |
| 26646 | 7590 | 10/08/2003 | EXAMINER | |
| KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004 | | | STORM, DONALD L | |
| | | ART UNIT | PAPER NUMBER | |
| | | 2654 | 12 | |
| DATE MAILED: 10/08/2003 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/530,389 | BERGER, JENS | |
| | Examiner | Art Unit | |
| | Donald L. Storm | 2654 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on April 27, 2000 through May 24, 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 7-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 7-10 is/are rejected.
- 7) Claim(s) 11-14 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 04 April 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>10 & 11</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. On pages 2-3 of PRELIMINARY AMENDMENT filed April 27, 2000 (paper 9), several amendments are directed to specific pages and lines of the specification by page and line numbers. The directions for the entry are defective, such as inaccuracy in the page or line designated. The part of the amendment directed to the specification has not been entered because defective directions and context leave doubt as to the intent of the Applicant. As a result, no changes have been made to the specification. No changes have been made to the abstract. See MPEP § 714.23. The title and the claims have been amended.

The inaccuracies in designating pages and lines in the specification and abstract are so numerous as to suggest to the Examiner that the Office's copy of this specification is not identical to the Applicant's copy. To avoid further confusion and delays, the Applicant is encouraged to submit an appropriate substitute specification and abstract that includes the amendments that were intended by PRELIMINARY AMENDMENT (paper 9) as part of any response to this Office action.

Information Disclosure Statement

2. A copy of the International Search Report (Form PCT/ISA/210) (paper 10) and the copies of the documents are present in the application file, and they have been considered by the Examiner.

3. A copy of the German counterpart search report (paper 11) and the copies of the documents are present in the application file, and they have been considered by the Examiner.

Oath/Declaration

4. The declaration is defective because it states that the inventor is a joint inventor of the invention claimed, but only one inventor is listed.

The deficiency in the declaration filed April 27, 2000 (paper 1) appears to be minor and self-correcting according to MPEP § 602.03 and In re Searles, 422 F.2d 431, 437, 164 USPQ 623, 628 (CCPA 1970). Such a deficiency may be waived by a Primary Examiner at the time of allowance.

Accordingly, no action is required by the Applicant at this time. At the time of allowance, the Primary Examiner will make a determination whether the deficiency in the declaration should be waived considering the totality of evidence in the application at that time. The Examiner suggests that the Applicant include a request for waiver in any response to this Office action. Alternatively, the Applicant may choose to submit a substitute oath or declaration correcting the deficiency.

Drawings

5. The proposed substitute drawings submitted by the Applicant were received on April 4, 2001 (paper 7), and these drawing sheets are substantively acceptable to the Examiner. These drawings have been entered and are now the Figs. 1, 2a, 2b, and 3 of record.

Specification

6. The title is objected to because it is not sufficiently descriptive of the invention. A new title is required that is clearly indicative of the invention to which the claims are directed. See

MPEP § 606.01. The Examiner suggests that the Applicant consider a title including these elements: "Method for Determining Objective Speech Quality Measures with Reducing Differences between assessed and Reference Speech Signals."

7. The abstract is objected to because the abstract should not refer to purported merits or speculative applications of the invention as in the final sentence, and the abstract should not compare the invention with the prior art as in the first two sentences. See MPEP § 608.01(b). Appropriate correction is required.

8. The specification is objected to because a section containing a brief description of each figure, as required by 37 CFR § 1.74, is not present. Because changes to the specification that were requested in PRELIMINARY AMENDMENT (paper 9) could not be made due to inaccuracies in indicating page and line numbers for amendment, its descriptions of the drawings are not included in the specification.

Claim Informalities

9. Claims 11-14 are objected to as being (directly or indirectly) dependent upon a rejected base claim. See MPEP § 608.01(n)V.

10. The Examiner notes, without objection, the possibility of informalities in the claims. The Applicant may wish to consider changes during normal review and revision of the disclosure.

In claim 11, line 3, should the word "characteristics" be --characteristic--?

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Beerends and Hollier

12. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beerends et al. [International Publication WO 96/28952] in view of Hollier [US Patent 5,621,854, already of record.

13. Regarding claim 7, Beerends and Hollier describe and make obvious the claimed limitations as a whole recognizable to one versed in the art because Beerends [at abstract] describes an embodiment for a signal processor generating an objective quality measure of a signal and explicitly describes the following elements:

a quality characteristic value [see Fig. 1, item 17 and its description throughout];
respective spectral short-time properties of an assessed speech signal [see Fig. 1, item 1 and its description, for example at page 9, lines 24-26 as the frequency domain transform of the first signal are first signal parameters];

respective spectral short-time properties of a reference speech signal [see Fig. 1, item 2 and its description, for example at page 9, lines 24-26 as the frequency domain transform of the (second) signal are second signal parameters];

calculating the quality by comparing them [see Fig. 5, item 50 and its description, for example page 13, line 21-page 14, line 19];

respective mean spectral envelopes of the assessed speech signal [at page 17, lines 5-24, as average values of first signal parameters];

respective mean spectral envelopes [at page 17, lines 5-24, as average values of signal parameters];

the envelope is of the reference speech signal [at page 19, lines 5-11, as also couple to the second series circuit, the second output of the second series circuit];

differences in those means [at page 17, lines 24-25, as difference between the last of each parameter and the average];

reducing that difference [at page 16, line 27, as reduce the amplitude of the differential signal];

prior to comparing the respective short time spectral properties, reducing the differences [at page 19, lines 5-8, as discounting and converting inside the series circuit, that is, with the fifth signal coupled to the first series circuit];

spectral weighting function so as to include differences in the respective mean spectral envelopes in the quality characteristic value to a limited extent, the spectral weighting function being calculated from the respective mean spectral envelopes [at page 21, lines 30-37, as deduct from the absolute value of the difference a (portion of a) series circuit signal];

the reducing is by using the weighting function for weighting the properties of the signal in a predetermined number of time segments [at page 16, lines 5-27, as the signal parameters input to the discounting circuit are at four time points];

weight the assessed signal [at page 17, lines 5-24, as values of first signal parameters];

weight the reference signal [at page 19, lines 5-11, as also couple to the second series circuit, the second output of the second series circuit]

limits for the frequency bands [at page 9, line 35, as the Bark spectrum]; calculating a respective intensity value for each frequency band in a signal segment using the limits [at page 19, lines 33-37, as convert the power per time/frequency by resampling on the basis of the Bark scale];

calculate it for the assessed speech signal [at page 9, lines 16-35, as transform and convert the signal fed to the first input];

calculate it for a reference speech signal [at page 9, lines 16-35, as transform and convert the signal fed to the (second) input];

so the respective difference between each calculated respective intensity of the assessed speech signal and the reference speech signal is reduced [at page 16, lines 13-22, the (amplitude) difference is discounted as a result].

Beerends' [at page 4, line 15] gives the example of quality characteristic value measured for codec signals; however, Beerends does not explicitly describe speech as the type of signal for which the quality is measured. Nevertheless, it would have been obvious to one of ordinary skill in the art of codec signals at the time of invention that Beerends [at the ISR form PCT/PSA/210] is suitable for speech signals of a voice codec.

Hollier [at columns 1-2] is one who is aware of the suitability of Beerends descriptions for speech quality measurements of codec signals; consequently, Hollier describes:

a speech quality characteristic value [at column 21, lines 1-7, as a distortion perception measure applied to speech signal processing circuits];

the assessed signal [at column 8, lines 30-37, as the test signal through the telecommunications apparatus];

the reference signal [at column 6, lines 59-61, as the test signal without passing through the telecommunications apparatus];

the signals are speech [at column 4, lines 28-31, as the test signal corresponds to speech sounds]; and

calculating using variable limits for the frequency bands [at column 6, lines 18-26, as warping the scale to a width at the 3 dB points that varies with the frequency].

To the extent that Beerends codec signal is not speech sounds, it would have been obvious to one of ordinary skill in the art of quality measurements of codec signals at the time of invention to use Hollier's concept of a speech test signal and measure speech quality because Hollier [at column 2, lines 14-20] points out that it would appear obvious, when testing coder for human speech, to use human speech samples. In addition, Hollier [at column 6, lines 25-30] uses the -3 dB points to define the limits of Bark bands, and Hollier describes these limits as variable.

14. Regarding claim 8, Beerends also describes:

the respective difference is a respective minimum [at page 21, lines 33-34, as the final result must not be permitted to be negative].

15. Regarding claim 9, Beerends also describes:

calculating the mean spectral envelopes in the form of respective mean power density spectra [at page 19, lines 24-28, as the time and frequency spectrum determines a power density function per time/frequency];

wherein the calculating of the spectral weighting function is performed using respective quotients of the respective mean power density spectra [at page 17, lines 5-32, as the output four signal parameters, each the result of division by the average value];

and wherein a short-time power density spectrum of the reference speech signal is weighted with the spectral weighting function before calculating the speech quality characteristics value [at page 19, lines 5-8, as discounting and converting inside the series circuit, that is, with the fifth signal coupled to the first series circuit].

16. Regarding claim 10, Beerends also describes:

before reducing the differences, calculating the respective mean spectral envelopes of the assessed speech signal and the reference speech signal [at page 17, lines 5-24, as average values of first signal parameters];

the signals are in the form of respective mean power density spectra [at page 19, lines 24-28, as the time and frequency spectrum determines a power density function per time/frequency];

wherein the calculating of the weighting function is performed for partial regions of the calculated respective means spectral envelopes so that the reducing differences in the means spectral envelopes occurs only in the partial regions [at page 17, lines 5-32, as the signal parameters are discounted at four frequencies].

Allowable Subject Matter

17. Claims 11-14 recite allowable subject matter when considered with the limitations of the base claim and intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter:

a. Claim 11 requires selecting frequency bands that are constant on a pitch scale such that a loudness calculated from integrating intensity in the constant bands has a minimum difference in each band between calculated loudness of the assessed and reference speech signal. The closest prior art (Hollier) describes intensity, pitch bands, and loudness. However, Hollier does not set a minimum loudness difference in each band as a criterion for selecting limits of constant bands on the pitch scale.

b. Claim 12, and by dependency claims 13-14, require basing the speech quality value calculation on a correlation coefficient representation of the similarity in one time segment between the assessed spectrum and the reference spectrum and averaged over time segments. The closest prior art that was found (Beerends, Hollier) describe differences between the spectra and generally discuss how distortions affect their similarity to each other. Neither Beerends nor Hollier describes correlation coefficients or averaging over time to determine a similarity value.

Neither Beerends nor Hollier make the whole specific subject matter of these claims obvious to one of ordinary skill in the art of speech quality determination, particularly with a spectral weighting function that includes limited differences between spectral envelopes.

Conclusion

19. The following references here made of record are considered pertinent to applicant's disclosure:

Boggs [US Patent 4,860,360] compares standard speech and distorted speech in critical bands using a variance-covariance matrix and a Mahalanobis distance as a speech quality value. Beerends [US Patent 6,064,966] describes the same as [International Publication WO 96/28952].

20. Any response to this action should be mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9314, (for formal communications intended for entry)

Or:

(703) 872-9314, (for informal or draft communications, and please label
"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA (Sixth Floor, Receptionist)

21. Any inquiry concerning this communication or earlier communications from the examiner
should be directed to Donald L. Storm, of Art Unit 2654, whose telephone number is
(703)305-3941. The examiner can normally be reached on weekdays between 8:00 AM and 4:30
PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, Richemond Dorvil can be reached on (703)305-9645. Any inquiry of a
general nature or relating to the status of this application or proceeding should be directed to the
Technology Center 2600 Customer Service Office at telephone number (703)306-0377.

September 30, 2003

Donald L. Storm
Donald L. Storm
Patent Examiner
Art Unit 2654